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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/628,528	07/28/2003	Deming Liu	P/4076-57	4308

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EXAMINER

MAI, NGOCLAN THI

ART UNIT	PAPER NUMBER
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1742

DATE MAILED: 06/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

10/628,528

Applicant(s)

LIU ET AL.

Examiner

Ngoclan T. Mai

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-22 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7, 9-16, 18 and 20-22 is/are rejected.
- 7) ☒ Claim(s) 8, 17 and 19 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-4 are rejected under 35 U.S.C. 102(b) as being anticipated by Jatkar et al.

Jatkar et al discloses silicon carbide-aluminum alloy matrix composites comprising aluminum alloy powder and silicon carbide having an average particle size of about 3 microns in amounts of 5, 10, 15, 20, 25 and 30 volume percent of the composite. See col. 5, line 67 to col. 6, line 18. The composites are formed into rod, bar, wire, tube, sheet and the like by working the sintered billets or slabs of the composites. Jatkar et al discloses using aluminum alloy in the 1000, 2000, 3000, 4000, 5000, 6000, 7000, and 8000 series as defined by the Aluminum Association. See col. 3, lines 42-44. Note that these alloys are Duralumin and super Duralumin alloys.

3. Claims 1 and 4 are rejected under 35 U.S.C. 102(b) as being anticipated by Narula et al.

Narula et al discloses a metal-matrix composites comprising a substantially continuous phase of metal and reinforcing ceramic particulate substantially uniformly dispersed therein and comprising at least two of barium titanium, titanium dioxide, and

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titanium nitride. Narula et al teaches that ceramics having particle size preferably between 0.1 to 1 micron are used and that when aluminum is the matrix, 5 to 30 volume % of ceramics are used. See Col. 2, line 65 to col. 3, line 25.

***Claim Rejections - 35 USC § 103***

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 5-7, 9-16, 18, and 20-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mukarami et al. in view of Bomford et al. and Carden et al. (US 6,098,700).

Mukarami et al. discloses a process for making spent fuel storage member comprising ball milling a powder of aluminum and boron carbide in an argon atmosphere, molding the powder into a premolded body by cold isostatic pressing, canning the premolded body and sintering the canned premolded body. col. 1, line 55 to col. 2, line 5. Mukarami et al teaches that canning step can be omitted and sintering is performed by hot pressing in vacuum. See to col. 2, lines 6-15.

The differences between Mukarami et al and claim 5 are that Mukarami et al teaches adding surfactant such as ethanol or methanol to the vessel or balling-drum

before ball-milling instead of during ball-milling and heating the compact billet and semisolid die-casting to form a near net shape composite component.

Bomford et al. also teaches a method of making aluminum-ceramic composite by mechanically alloying where surfactant can be added directly into the mill with the charge powder particles and grinding media, before the milling operation is begun or it can be added periodically in the course of the mechanically alloying process. See col. 4, line 47 to col. 5, line 11.

Carden et al discloses a method for forming metal matrix composite material into shape by heating a billet formed of aluminum alloy reinforced with boron carbide to a temperature above the melting point of the aluminum matrix, softening the composite in the interior of the billet to form a semi-solid and die-casting the semi-solid by extruding the semi-solid billet through a die, col. 3, lines 9-67 and col. 6, lines 13-27.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add surfactant to powder charge taught by Mukarami et al during ball-milling instead of in the beginning since Bomford et al teaches that either way would work. Determination of an optimum time, after adding surfactant to the ball-milled powder to further ball-milling would have been obvious. It would also be obvious to form the billet taught by Mukarami et al into shape by semi-solid die casting as taught by Carden et al. since Carden et al teaches that metal matrix composite can be extruded into shape by die-casting.

With regard to claim 6, Mukarami et al. teaches that boron carbide is used in the mixed in an amount between 1.5 to 9 wt% and also teaches aluminum oxide from ethyl

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alcohol or methyl alcohol can be present to improve the mechanical strength. Based on this teaching it would have been obvious to add more than 9 wt% of the reinforcing material.

With regard to claim 7, Mukarami et al teaches using 450 kg of the ball to ball – milling 15 kg powder (ball to powder ratio is 30:1) with the milling time ranging from 1 to 10 hrs. Col. 8, lines 49-63.

With regard to claim 10, Mukarami et al. teaches hot pressing for 400-450 C for 30 sec under the pressure of 6,000 tons (~59 Mpa). See Col. 5, lines 50-56.

With regard to claim 11, Mukarami et al teaches this limitation in col. 6, line 58 to col. 7, line 1.

With regard to claim 14 the aluminum alloy taught by Mukarami et al in col. 4, lines 51-55 is a duralumin.

With regard to claims 15 and 20, Mukarami et al teaches the limitations in col. 10, line 5-20.

With regard to claim 16, Mukarami et al teaches the limitation in col. 8, lines 31-52.

With regard to claim 18, Mukarami et al teaches the limitation in col. 8, lines 55-57.

6. Claims 8, 17, and 19 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.


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7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Goto et al. US 4,060,411 is cited to show that the aluminum alloy disclosed by Jatkar et al and Mukarami et al is Duralumin or super Duralumin. See Goto et al. col. 1, line2 33 to 63.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ngoclan T. Mai whose telephone number is (571) 272-1246. The examiner can normally be reached on 7:30-4:00 PM Monday-Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on (571) 272-1244. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Ngoclan T. Mai  
Primary Examiner  
Art Unit 1742

n.m.